Agricultural Projections: A View from the FAO

Foresight in Agriculture:
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Outline

- Framework for projections
- Illustrative findings
- Future steps

What do we do?

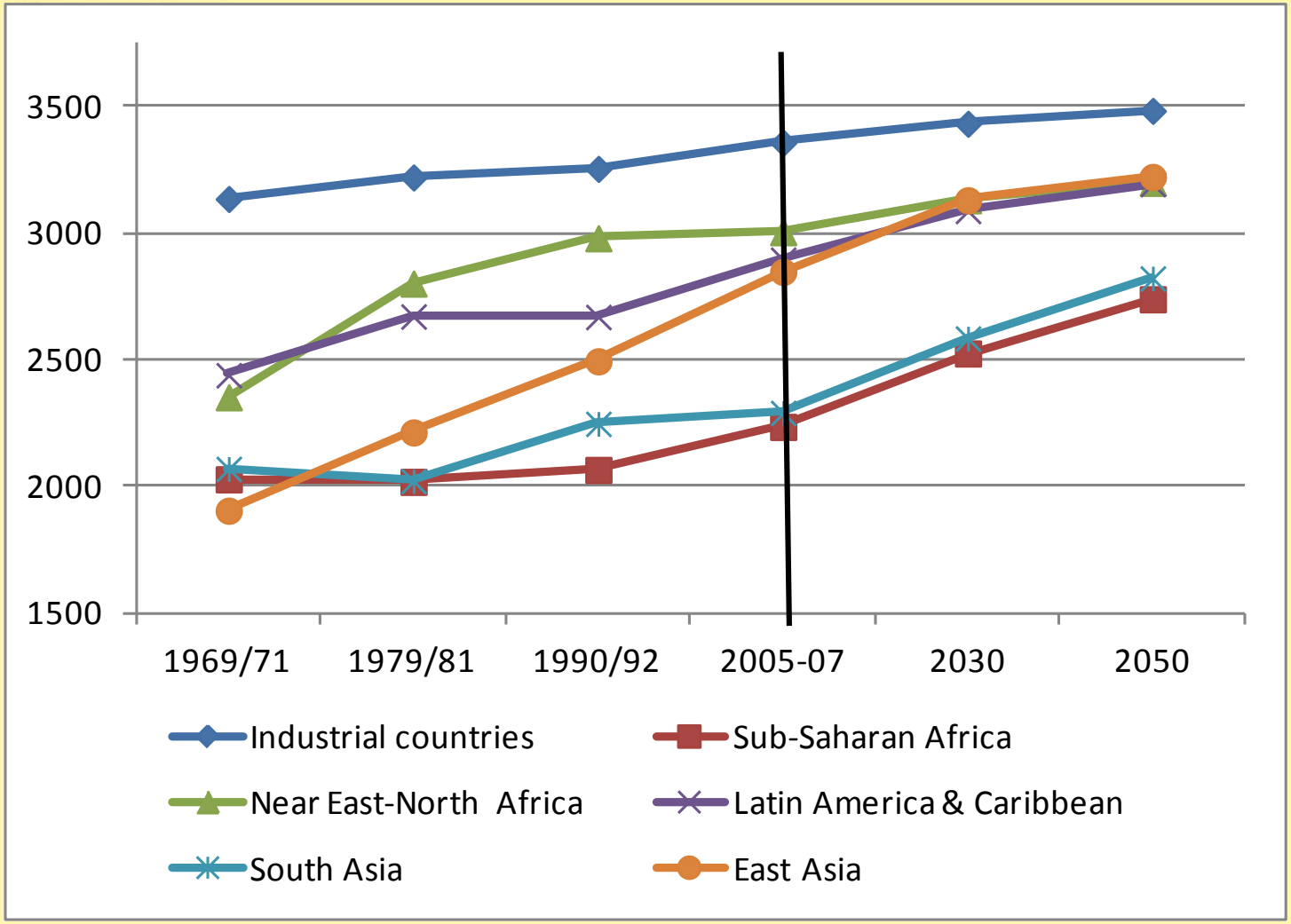
- Projection of supply and demand
  - 32 agricultural commodities
  - 140+ countries
  - 2005/07, 2015, 2030, 2050, (2080)
- Outputs
  - Consumer food demand, feed, seed, industrial use (incl. biofuels), waste, calories per person, hunger
  - Land use by broad land class and rainfed vs. irrigated
  - Production and net trade

How do we do it?

- Hybrid framework heavily reliant on expert knowledge and complemented by analytical framework for consistency check and deriving additional findings
- Key dynamic drivers include
  - Population (UN Population Division)
  - GDP (World Bank, SSPs)
  - Land suitability (IIASA/FAO GAEZ database)
  - Yield growth assumptions

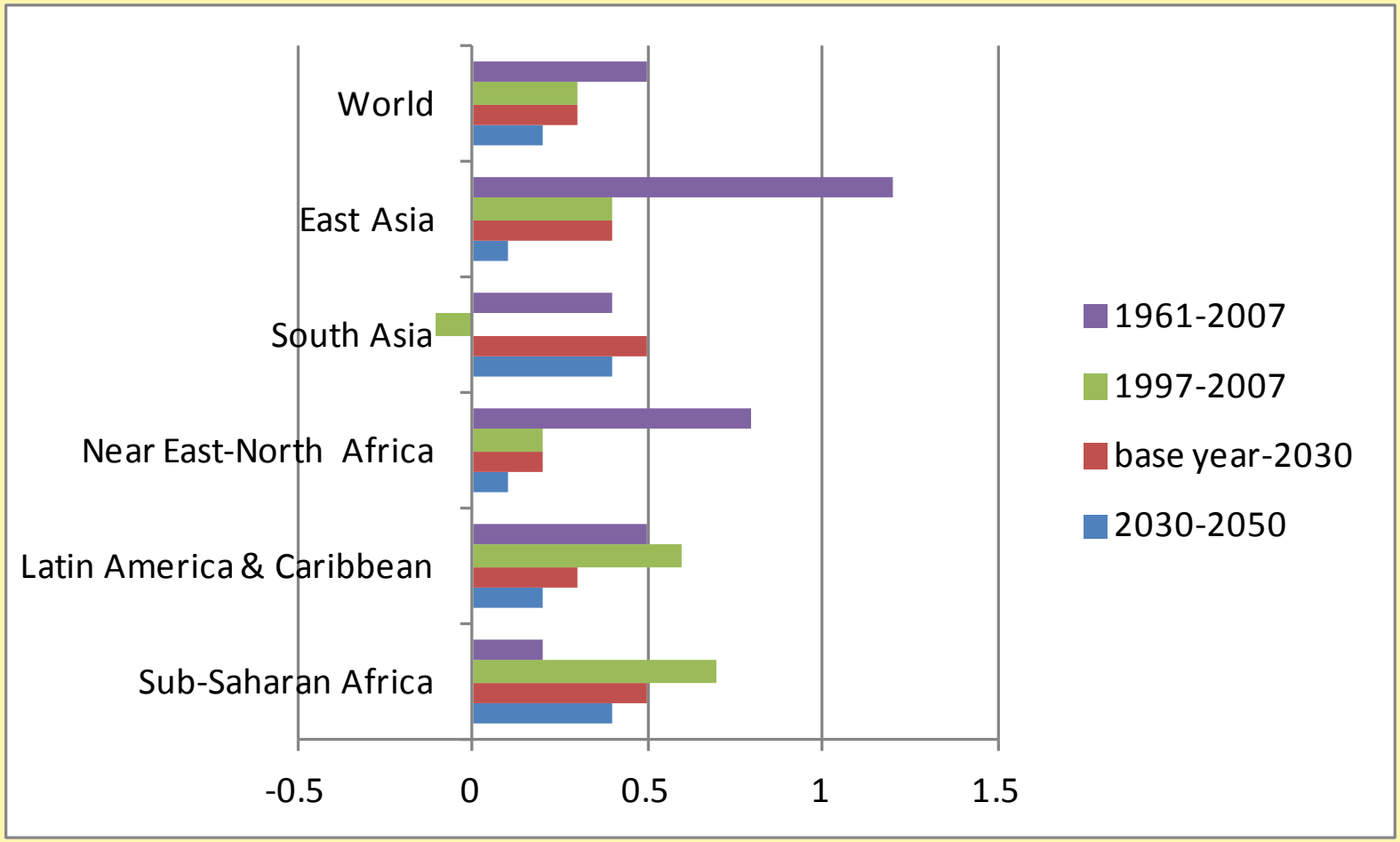
Food consumption

(Kcal/person/day)



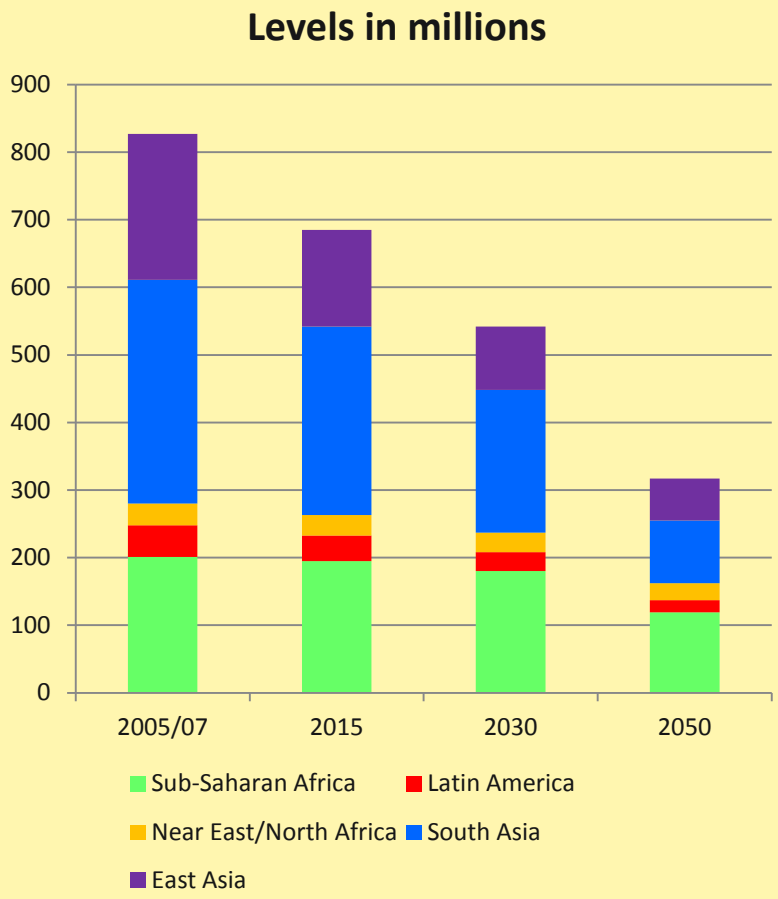
Source: FAO, 2011

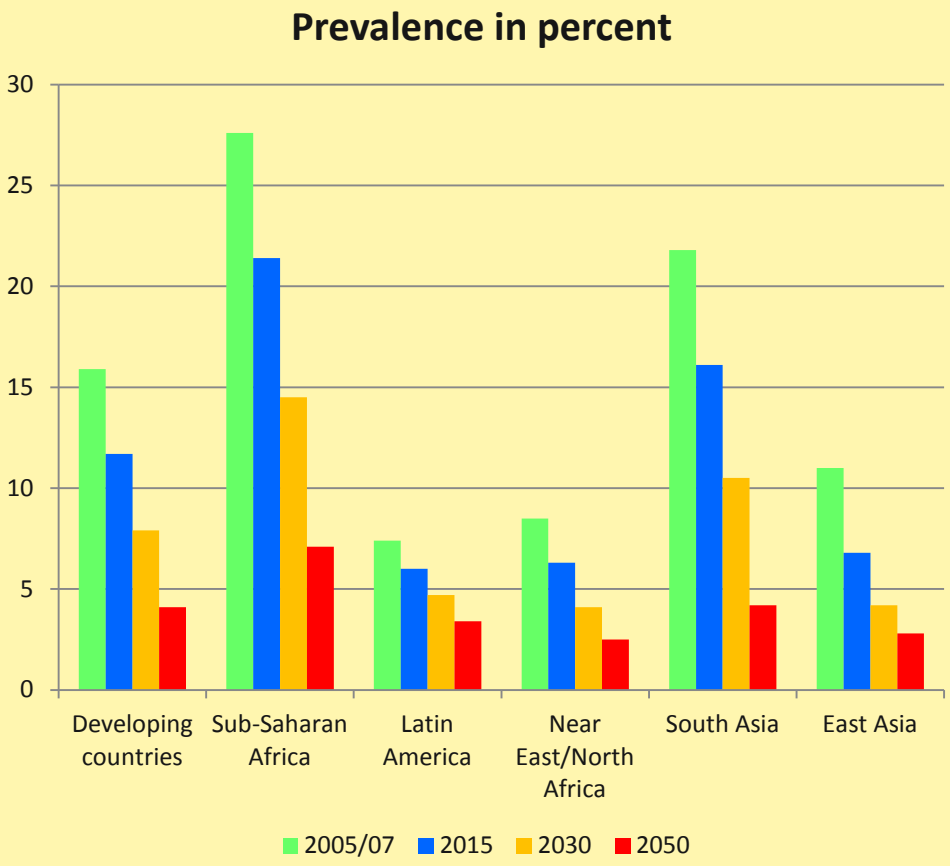
Growth rates: food consumption per capita is slowing down



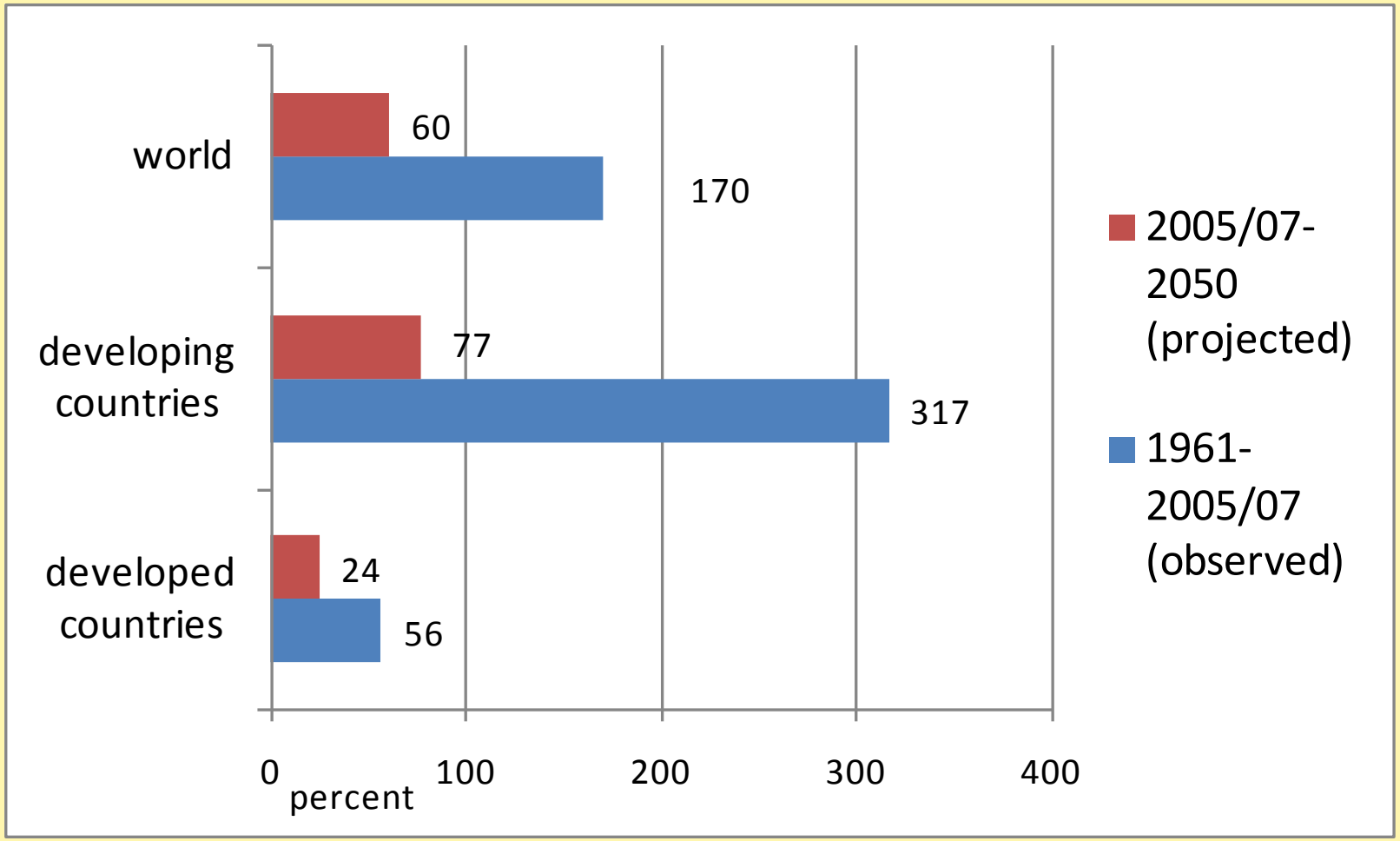
Source: FAO, 2011

Undernourishment



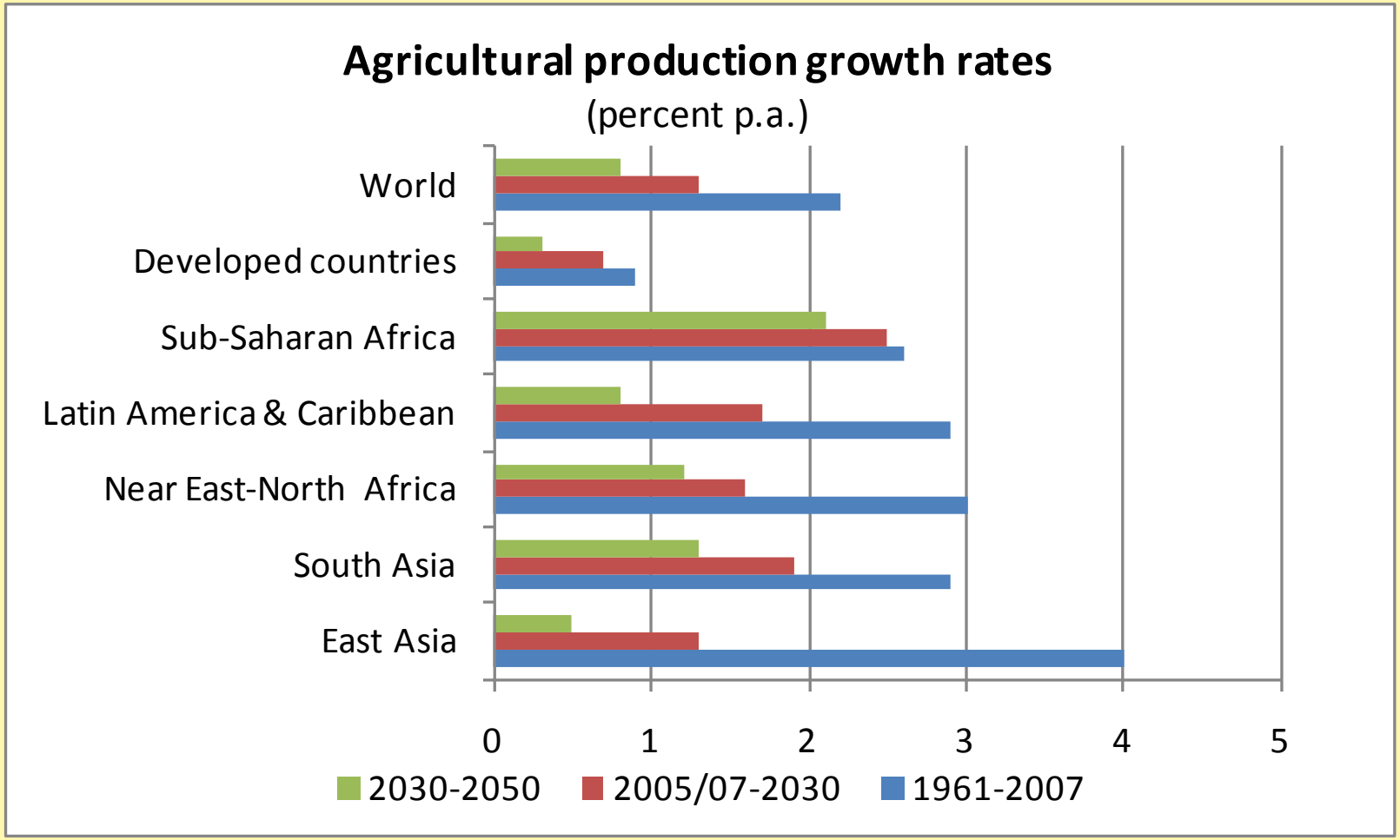


Past and projected increases in global production

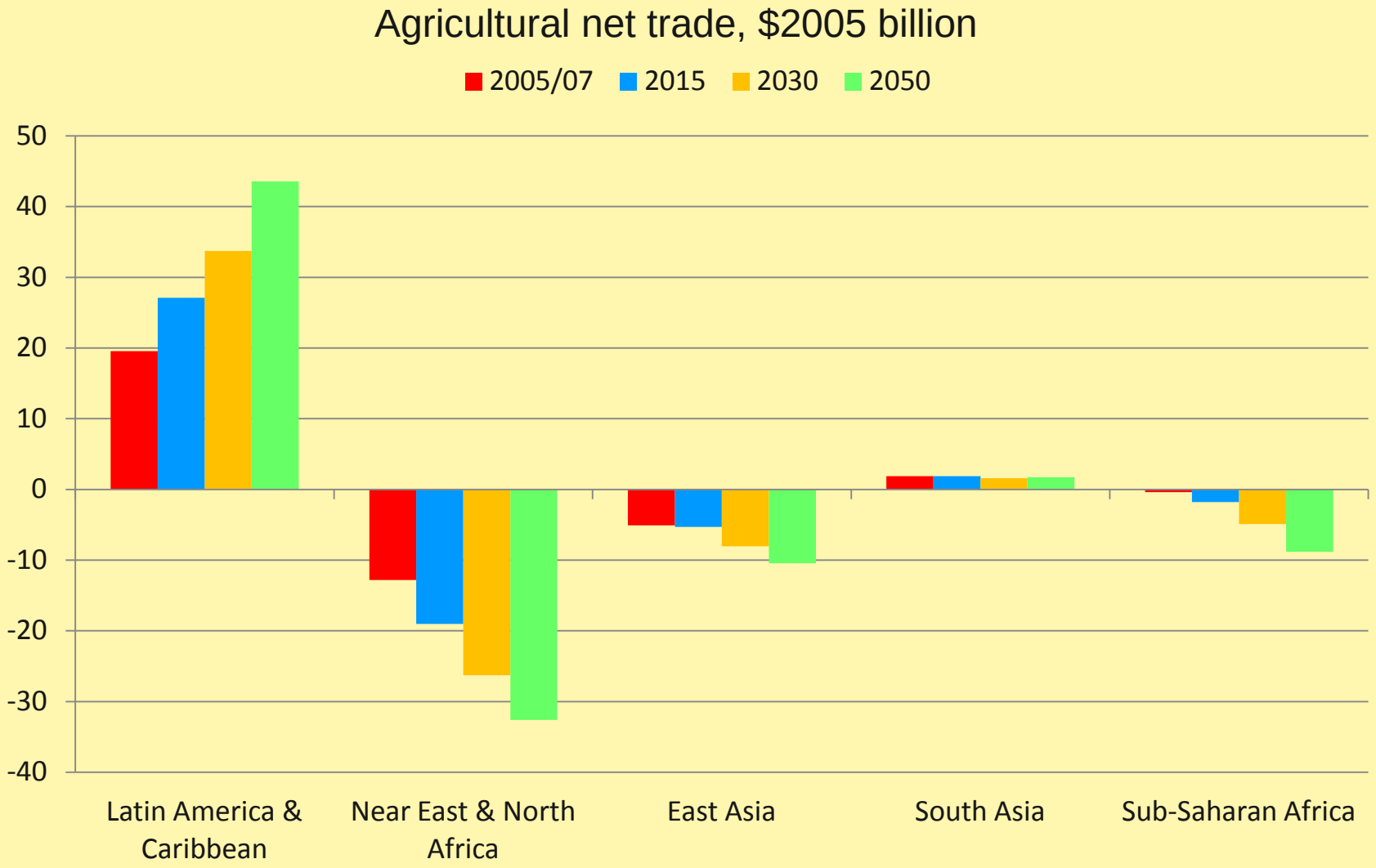


Source: FAO, 2011

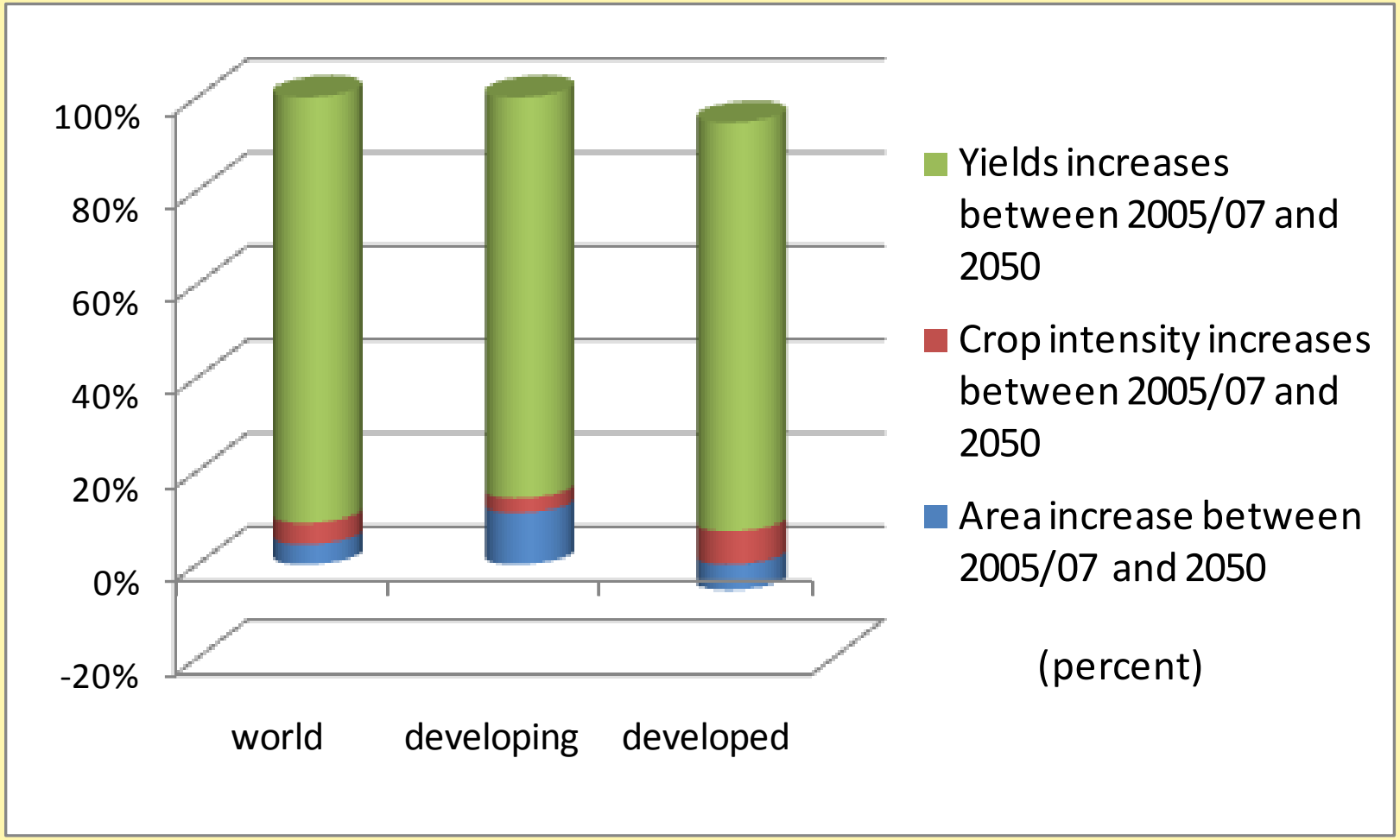
Production growth



Reinforcement of LAC's comparative advantage



Sources of production growth

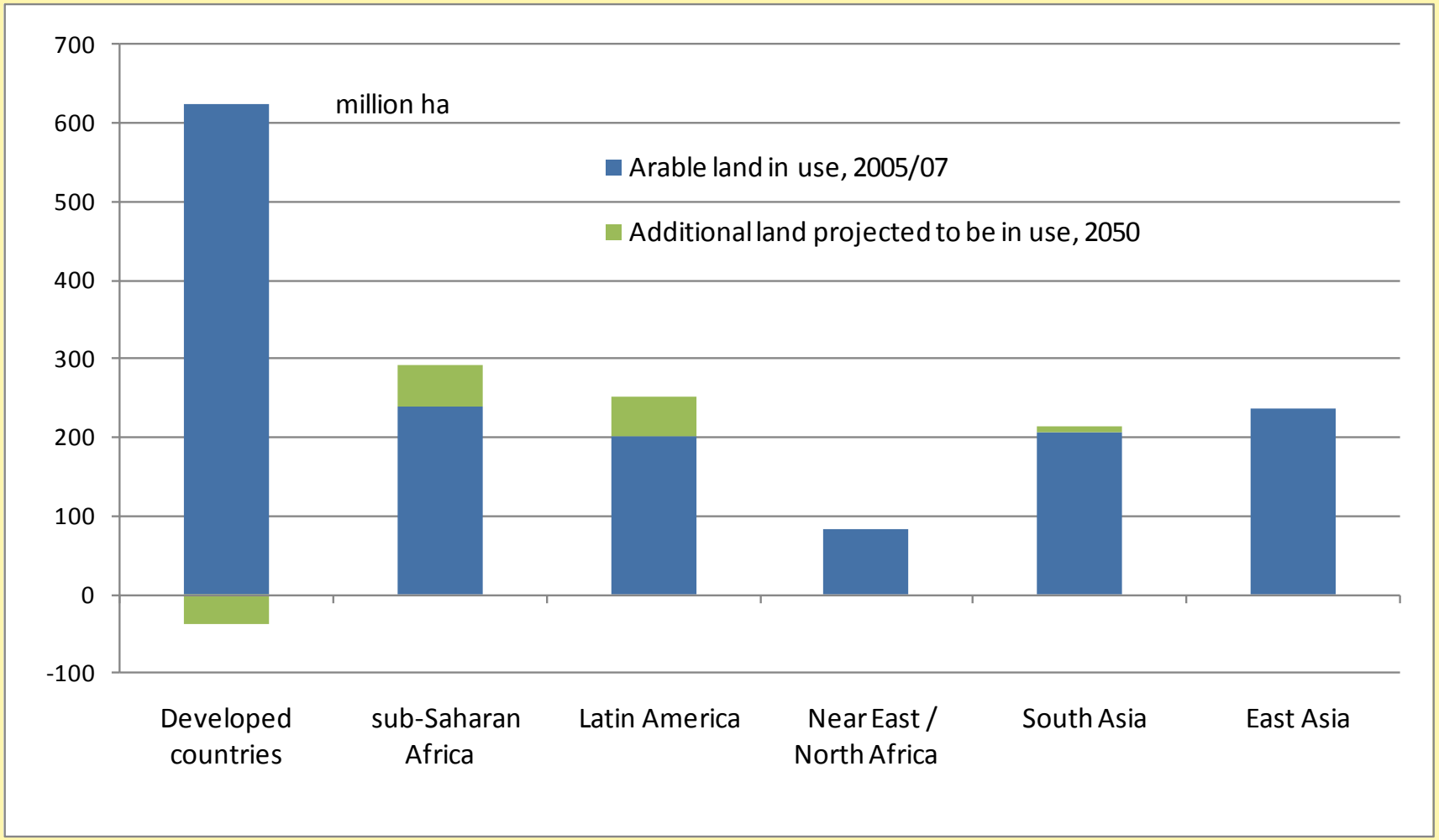


Source: FAO, 2011

Is there enough yield potential?

- **Yield growth: avg 0.8% per year to 2050 compared to 1.7% in the past decades**
- **Yield potentials**
  - **bridgeable yield gaps**
  - **room for intensification**
  - **technology could increase potentials**
  - **R&D most needed for food-security sensitive crops, eg millet, sorghum, R&T, pulses, plantains**

Is there enough land?



Caveats

- Water stress high in many areas, acute in Middle East, North Africa and South Asia
- Climate change
  - Perhaps near-term, certainly long-term
  - Unknown impact of carbon fertilization effect
  - Big problem is severe events
- Biofuels
  - Current mandates relatively modest effects

Several conclusions

- **Resources may be sufficient for 9.3 billion people, but**
  - **huge investment is required to increase productivity**
  - **and access to food remains an issue in some areas; "Malthusian traps" may arise in countries highly dependent on agriculture, with low ag productivity and fast population growth**
- **Yield increases may be feasible, but management of resources needs to improve substantially to counteract overuse, degradation and competition among different uses (land, water)**
- **Bio-fuel development and climate change are major sources of uncertainty**

Future steps

- ‘Digitizing’ expert knowledge
  - PE framework
  - Sensitivity analysis
  - Policy analysis (e.g. resource use, loss, waste and changes in food consumption behavior, 1st and 2nd generation biofuels)
- Complement with CGE analysis
  - Focus on development issues, e.g. rural livelihoods, rural/urban migration, economy-wide interactions
  - Climate change—impacts, adaptation and mitigation
- International model comparison exercise (AgMIP)